

## **REMARKS**

### **I. Status of the Claims**

At the time of the Action, Claims 1-17, 20-28, 30-32, 34-37, 39, 40, 43, 44, 46-51 and 53-55 were pending. Claims 12-17 were indicated in the Action to be allowable. Claim 43 was objected to for depending from a rejected base claim, but is indicated to recite allowable subject matter. Claim 43 has been canceled above, and its subject matter (along with that of Claim 39) has been incorporated into new Claim 57. Claims 1-11, 20-28, 30-32, 34-37, 39, 40, 44, 46-51 and 53-55 stand rejected under one of Section 102(e) and Section 103(a). These rejections are addressed below.

### **II. The Section 102(b) Rejections**

The Action rejects Claims 1-3, 7, 22, 23, 26-28, 30, 31, 34, 37, 39, 40, 44, 46, 47, 51, 53, and 55 under 35 USC § 102 as anticipated by U.S. Patent No. 6,328, 567 to Morris et al. (Morris). Applicants believe that this rejection is erroneous in that Morris uses **at least three colour references** (refer to abstract and column 9, lines 64-67) to correct the patient's image, at least one of the normalization references being selected from a shade standard. Attached is an annotated version of Morris's Figure 11, which describes in detail the Morris method of "normalization", with a comparison to the "normalization" of the present invention. It is apparent from this comparison that Morris requires at least three sets of colour references to correct a patient's image whereas in the system and method of the present invention a single grey reference is used, obviating the need for a plurality of references and, more importantly, obviating recourse to any standard set of reference dental shades.

In the RGB system, each coordinate has 3 digits (dimensions). Therefore, in Morris the black and the white standardization porcelains measured in RGB terms means that a 'perfect' black would have the coordinates 0,0,0 and a 'perfect' white the coordinates 256,256,256. However, an almost 'perfect' black would be **also** be represented by 0,0,1 or 0,1,0 or 0,0,1, and so on, similarly the same would be true for a near perfect white of coordinates of 256,256,256.

Thus, there will be, in the Morris reference RGB system, possibly many hundreds (or thousands) of blacks and whites and associated errors in reference tab standardization. At best, it is believed that Morris intends the whitest and blackest colours in the image. Even so, by using two reference tabs from the opposite ends of the spectrum Morris does not provide an advantage offered by the present invention: namely, with a single set of specific RGB grey coordinates the errors associated with reference tabs are substantially reduced.

The single grey reference colour indicator used in the system and method of the present invention conveniently combines the three primary RGB colours in equal amounts so that only a single reference indicator need be used for normalization, and certainly no tooth shade from a standard set colour guide need be used. In contrast, Morris uses a white reference set and a black reference set AND at least one dental tooth shade selected from a standard shade set by a technician (refer to column 10 lines 58-60). The single grey reference of the present invention takes the place of all three of Morris et al's reference colours and does not involve any subjective human assessment to select a dental tooth shade for best match from a standard colour set. Again, this is apparent from the comparison of the methods in the accompanying annotated Figure.

In view of the foregoing, it is clear that Morris fails to disclose at least this element of the claims. Accordingly, the Section 102(e) rejections based on Morris should be withdrawn.

### **III. The Section 103(a) Rejections**

Applicant also submits that the claimed subject matter is not rendered obvious by Morris. There is no suggestion in Morris to use anything less than three reference colours. In fact, quite the opposite is true, inasmuch as Morris states that the system requires the black and white references and at least one colour reference. For example, Morris states that:

“Many cameras have a non-linear colour range, thus calibrating with only black and white references may lead to colour distortion within the dynamic colour range of the image. For this reason, it is preferable to include at least one additional colour standard in the frame. Preferably one or more suitable dental shade standards are

placed in the frame of the picture to provide at least one colour reference within the dynamic colour range of the image. This “third” colour reference compensates for any colour range non-linearity due to the particular camera being used to capture the image.”

Morris at Column 7 lines 47-56. Further, Morris states that:

“To add a colour reference, the lab technician selects an “add reference” button 120 which again generates a selection area that is placed over a selected region, in this example, on the “a1” dental shade guide 121, see Fig 13. Additional colour references may be added to the normalisation references used to normalise the image by repeating the add reference procedure 53 just described.”

Morris at Column 9 lines 34-40. Thus, the ordinarily skilled artisan is directed to use at least one and possibly more of any of the standard shades from the standard shade guide. It is for this reason that the colour “light tan” is disclosed in Morris. The Action seems to take the position that the grey reference indicator of the present invention is merely an equivalent to this; however, this is not accurate, as there is no grey pantone 8 on a standard tooth shade reference set. Moreover, one benefit of using a single reference with approximately equal mid-range RGB values is that any error in colour matching can be minimized. A further advantage of a single reference colour indicator for normalization of a patient’s image is that the whole process can be more rapid, so the patient suffers minimal discomfort from prolonged open mouth and drying of the teeth which can cause further errors in colour matching.

Morris uses black and white non-reflective porcelain to determine absolute black and absolute white within the image and the third colour is selected from a standard shade set. This is not required in the present invention, as it is unnecessary to determine absolute black and white. The use of a single grey reference standard takes over this selection and the need for multiple reference colour indicators and is an advantage over Morris, as it allows a one-stage as opposed to a three- or more- stage standardization process. Moreover, there is no step that requires a lab technician to make a subjective selection of a tooth shade from a standard shade reference set. Accordingly, Applicants submit that Morris cannot render the present invention


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obvious. As such, Applicants respectfully request that the rejections under Section 103(a) be withdrawn.

#### **IV. Conclusion**

Inasmuch as all of the issues raised in the Action have been addressed, Applicants submit that the present application is in condition for allowance and the same is earnestly solicited. The Examiner is invited to telephone the undersigned at 919-854-1400 for resolution of any outstanding issues.

Respectfully submitted,



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